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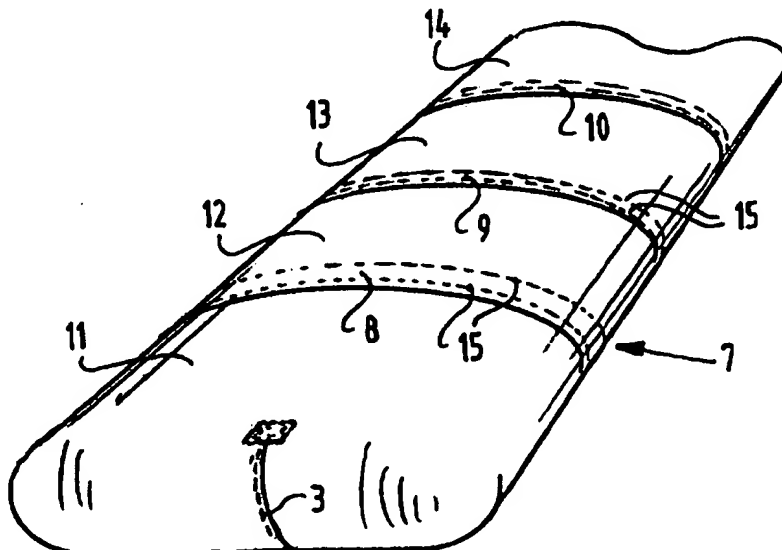
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<b>(21) International Application Number:</b> PCT/NL97/00043 <b>(22) International Filing Date:</b> 10 February 1997 (10.02.97) <b>(30) Priority Data:</b> 1002277 8 February 1996 (08.02.96) NL <b>(71) Applicant (for all designated States except US):</b> TEN CATE NICOLON B.V. [NL/NL]; Sluiskade N.Z. 14, NL-7602 HR Almelo (NL). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> KEMPERS, Anton, Daniel [NL/NL]; 't Veld 21, NL-7603 EV Almelo (NL). <b>(74) Agent:</b> SCHUMANN, Bernard, Herman, Johan; Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK The Hague (NL).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Dutch).</i>

**(54) Title:** ELONGATE FLEXIBLE CONTAINER

**(57) Abstract**

The invention provides an elongate flexible container (7), predominantly consisting of a textile fabric, for filling only through at least one filling opening with loose or little coherent solid material, such as sand or other ground material, for the formation of a body, e.g. for use as a core or base of dam, a quay, a bank reinforcement, a jetty or a breakwater, for filling holes or trenches, e.g. in the bed of a waterway, or for the packaging and storage of contaminated material, said container (7) at its upper side being provided with at least one filling opening in which container (7) at its upper side a stitching seam (3) extending in the longitudinal direction of the container (7) being arranged, said seam (3) mutually connecting the facing edge zones of a textile fabric.



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### Elongate flexible container

For the positioning in a chosen position of a relatively heavy and deformable body, which is capable of accommodating itself to the shape of the ground, the invention provides a elongate flexible container, predominantly consisting of a textile fabric, for filling only trough at least one filling opening with loose or little coherent solid material, such as sand or other ground material, for the formation of a body, e.g. for use as a core or base of a dam, a quay, a bank reinforcement, a jetty or a breakwater, for filling holes or trenches, e.g. in the bed of a waterway, or for the packaging and storage of contaminated material; said container at its upper side being provided with at least one filling opening, in which container at its upper side a stitching seam extending in the longitudinal direction of the container being arranged, said seam mutually connecting the facing edge zones of a textile fabric.

Due to the fact that the flexible container, which has a sufficient tensile strength and wear-resistance, is provided at its upper side with a filling opening and at its lower side a stitching seam, the solid filling material can be chuted from the upper side through the filling opening into the container. By this chuting of loose or little coherent solid material the stitching seam arranged at the lower side on the bottom is covered by the chute material, as a result of which this stitching seam and the adjacent fabric is gradually and in an increasing degree covered by a mass of the filling material enclosing the fabric and the stitching seam, together with the bottom material. It is thus effectively achieved that the related fabric and thus the stitching seam is no longer or at most to an absolutely negligible degree subjected to tensile forces which would tend to tear open the stitching seam.

It is noted that in applicants' patent application "flexible container", which is filed on the same day as the present application, a container is described and shown, which over its entire surface is provided with mutually spaced through-holes covered with gauze. As a result of this air and water can pass, but the solid chute material is confined in the container. Such covered holes can advantageously also being used in connection with the elongate flexible container according to the present invention. However, the present invention itself does not relate to this feature.

An alternative embodiment has the characterizing feature that the container comprises a plurality of parts abutting in longitudinal direction and being mutually connected by stitching seams, said stitching seams extending substantially transversely relative to the longitudinal direction. It should be understood that the tensile forces mainly extend in a tangential direction in the textile fabric, extending transversely relative to the longitudinal direction of the container. Due to the fact that the stitching seams in the described alternative embodiment extend in this mentioned transverse direction they are not or at most in negligible degree loaded by tensile forces, which might tear apart the stitching seams.

E.g. in order to achieve a homogeneous filling the container may be characterized by a plurality of filling openings arranged in distributed manner over the entire length of the container, e.g. at regular mutual distances of e.g. about 25 m.

A preferred embodiment has the characterizing feature that the or each filling opening comprises a flexible tube.

This last-mentioned alternative embodiment preferably has the feature that the tube has a length of 0,5-3 m and a diameter of 0,20-0,70 m.

A specific embodiment has the feature that the textile fabric is water-permeable.

The textile fabric of the container must have a sufficiently high strength in order not to lose its integrity, particularly during the filling. In connection therewith a preferred embodiment has the feature that the fabric has in both main directions a tensile strength of over 80 kN/m.

A specific embodiment has the feature that the fabric substantially consists of PP (polypropylene).

An alternative has the feature that the fabric substantially consists of a polyester and PE (polyethylene).

Furthermore, the invention is relative to a method for filling a flexible container of the type described, of which container the or each filling opening comprises a flexible tube. This method according to the invention comprises the steps of:

bringing a supply tube of fixed shape through the flexible tube into the container;

temporarily coupling the flexible tube with the supply tube by means of a clamping band or the like; pumpingly supplying a flow of material, if desired in combination with water, through said supply tube;

decoupling the supply tube and the flexible tube; and

if desired, bringing said flexible tube into the container.

The invention will now be explained with reference to the accompanying drawings of some embodiments. In the drawings:

figure 1 shows a partly broken away partly perspective view of an elongate container;

figure 2 shows a partly perspective view of an alternative embodiment;

figure 3 shows a partly perspective view of an other embodiment;

figure 4 shows a partly perspective view of a part of the container according to figure 3.

Figure 1 shows an elongate flexible container 1 predominantly consisting of a textile fabric. The container is formed by mutually connecting the textile fabric by means of a stitching zone 2 with its longitudinal edges for forming the tubular structure shown in figure 1. The stitching zone 2 comprises two stitching seams 3, 4 at the lower side of container 1 which in the situation shown in figure 1 is filled with loose or little coherent solid material 5. It is noted that it has not been shown that at the upper side of the container on or more filling openings are arranged. This aspect will be discussed with reference to figure 3. Figure 1 shows an important aspect of the invention. Since the stitching zone 2 is arranged at the lower side of the container, it is fully embedded between the filling material arranged at the upper side and the ground material 6 present at the lower side. Different from what would be the case if the stitching seam or stitching seams would be arranged at the upper side, in this way the stitching zone 2 is effectively decoupled from tensile forces in transverse direction relative to the longitudinal direction of the container 1. This ensures a very long lifetime of the container, whilst the stitching seam 3, 4 can be embodied relatively weakly.

Figure 2 shows an embodiment, in which a container 7 is provided with a stitching seam 3 arranged at its lower side and extending in longitudinal direction. The container 7 is comprised of a plurality of parts 11, 12, 13, 14 mutually abutting and mutually connected by stitching zones 8, 9, 10, said stitching zones 8, 9, 10 each comprising stitching seams which are all indicated with reference numerals 15 and extending transversely relative to the longitudinal direction.

Figure 3 shows an embodiment, in which a container 15, just like container 7 according to figure 2, comprises a stitching seam 3 arranged at its lower side. At the upper side the container 15 is provided with a plurality of flexible filling tubes 16, 17, 18,..... in

a distributed manner arranged over the entire length of the container 15. These filling tubes are arranged at regular mutual distances of e.g. about 25 meters. It is noted that during the filling with solid material through a filling tube the non-used tubes do not have to be made inoperative, but may serve as overpressure and/or overchuting valves. After filling the filling tubes 16, 17, 18 may be brought into the filled container, due to which as it were a natural closing is achieved.

Figure 4 shows the way, in which a filling tube is connected with the textile fabric 19 of container 15. Thereto a filling tube 17 which is tapering in the sense of widening in downward direction, is connected with the peripheral zone of an opening 22 in the fabric 19 through a stitching zone 21, in this case comprising four stitching seams 20. A stiff filling tube 23 fits in the smallest outer part of filling tube 17 and serves for chuting the solid material into the container 15 according to arrows 24 by means of pumping means not-shown. Since in this way a relative longitudinal movement force occurs between flexible filling tubes 17 and stiff filling tube 23, use is made of a clamping band 25 for mutually coupling these tubes. After filling the container the clamping by band 25 is made inoperative, tube 23 is removed and filling tube 17 may be inserted in the filled container through opening 22, as already indicated above.

It is noted that the elongate flexible container according to the present invention is generally suited to be positioned and filled on the dry land or at a relatively small depth on the bottom of a water way, e.g. a depth of less than 3 meters. The container according to the mentioned co-pending patent application for "flexible container" is generally used for larger depths, e.g. in the order of more than 4-6 meters.

It is furthermore noted, that figures 1, 2 and 3 show an idealized shape of the filled container. In general the container will exhibit a certain

irregularity, not only because it accommodates itself to the shape of the bottom. Furthermore, the container according to the invention is suited to be arranged in bended shapes.



### Claims

1. Elongate flexible container, predominantly consisting of a textile fabric, for filling only trough at least one filling opening with loose or little coherent solid material, such as sand or other ground material, for the formation of a body, e.g. for use as a core or base of a dam, a quay, a bank reinforcement, a jetty or a breakwater, for filling holes or trenches, e.g. in the bed of a waterway, or for the packaging and storage of contaminated material, said container at its upper side being provided with at least one filling opening, in which container at its upper side a stitching seam extending in the longitudinal direction of the container being arranged, said seam mutually connecting the facing edge zones of a textile fabric.
2. Container according to claim 1, in which the container comprises a plurality of parts abutting in longitudinal direction and being mutually connected by stitching seams, said stitching seams extending substantially transversely relative to the longitudinal direction.
3. Container according to claim 1, comprising a plurality of filling openings arranged in distributed manner over the entire length of the container, e.g. at regular mutual distances of e.g. about 25 m.
4. Container according to claim 1, in which the or each filling opening comprises a flexible tube.
5. Container according to claim 4, in which the tube has a length of 0,5-3 m and a diameter of 0,20-0,70 m.
6. Container according to claim 1, in which the textile fabric is water-permeable.
7. Container according to claim 1, in which the fabric has in both main directions a tensile strength of over 80 kN/m.

8. Container according to claim 1, in which the fabric substantially consists of PP (polypropylene).

9. Container according to claim 1, in which the fabric substantially consists of a polyester and PE (polyethylene).

10. Method for filling a container according to any of the claims 4 and 5, comprising the steps of:  
bringing through the flexible tube into the container of a supply tube of fixed shape;  
temporarily coupling the flexible tube to the supply tube by means of a clamping band or the like;  
pumpingly supplying a flow of material, if desired in combination with water, through said supply tube;  
decoupling the supply tube and the flexible tube; and  
if desired, bringing said flexible tube into the container.

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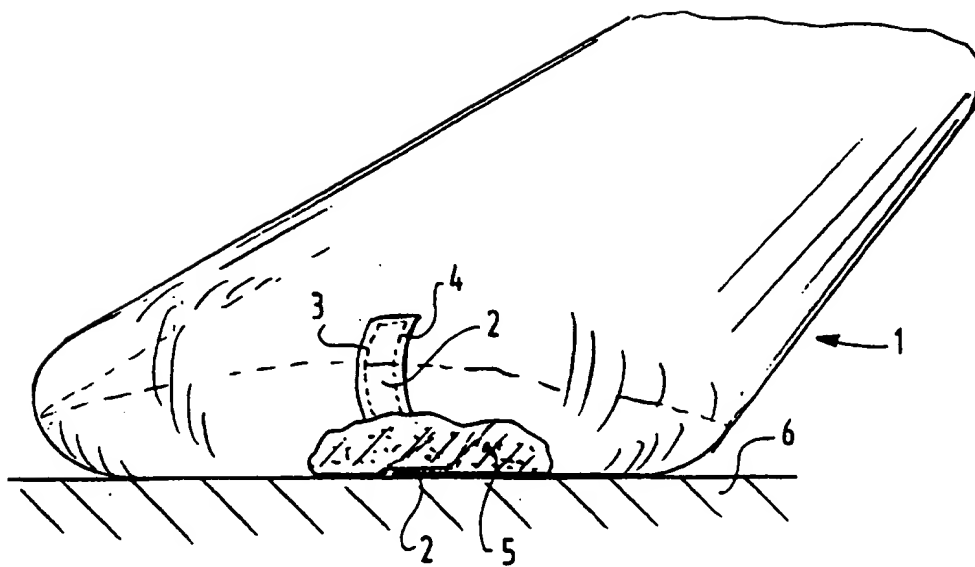


FIG. 1

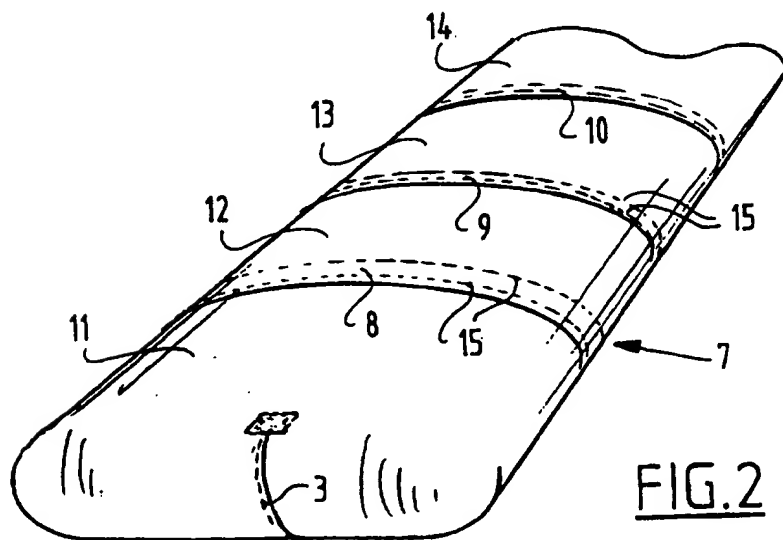
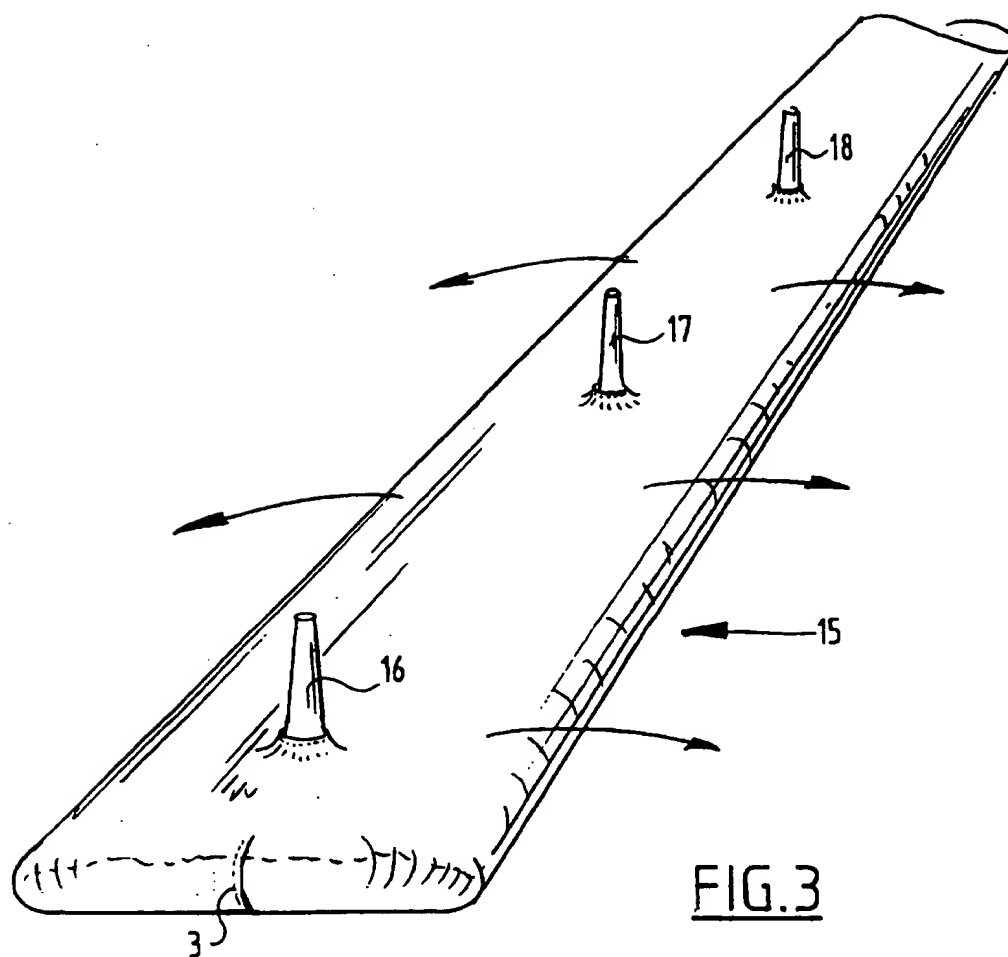


FIG. 2

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3/3

